



Chapter 19 Air Operations



Overview

Introduction

Coordinated operation between boats and aircraft creates a valuable team for Coast Guard missions. While an aircraft can generally search an area faster or may arrive on-scene sooner, a vessel can investigate more thoroughly and usually provide more direct assistance. Whether a pollution incident or a SAR case, boats and aircraft may be called upon to work as a team.

Boat operations with aircraft usually involve transfer of a person or equipment between a helicopter (rotary-wing) and a boat. Sometimes, a boat must coordinate with a fixed-wing aircraft. The *Coast Guard Addendum to the National Search and Rescue Manual*, COMDTINST M16130.2 (series), has a list of capabilities and deliverable search and rescue (SAR) equipment for each type of Coast Guard aircraft. Auxiliary facilities include fixed-wing general aviation aircraft. Boat crews need to be aware that easily recognized Coast Guard aircraft and some privately owned small aircraft or Auxiliary air facility may try to contact and operate with them.

In this chapter

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Section A. Helicopters and Equipment

Overview

Introduction

Excellent multi-mission capabilities are available in the Short-Range Recovery (SRR) helicopter HH-65A and the Medium-Range and Recovery (MRR) helicopter HH-60J. Helicopter maneuverability and outstanding crew visible scanning capabilities enable the crew to closely inspect sightings and search shorelines. They are flexible rescue platforms, capable of recovering people from a wide variety of distress situations on land or water. Both helicopters can:

- Hover
- Deploy rescue swimmers/emergency medical technicians (EMTs)
- Perform hoists using rescue basket, stokes litter, or rescue strop
- Deliver equipment; e.g., dewatering pump and fire suppression kits, when available
- Deploy datum marker buoys
- Search with radar
- Provide night illumination
- Direction find
- Perform multi-mission patrols
- Conduct supply/replenishment operations

NOTE

The HH-60J has night vision goggles and forward-looking infrared capabilities.

In this section

These items are discussed in this section

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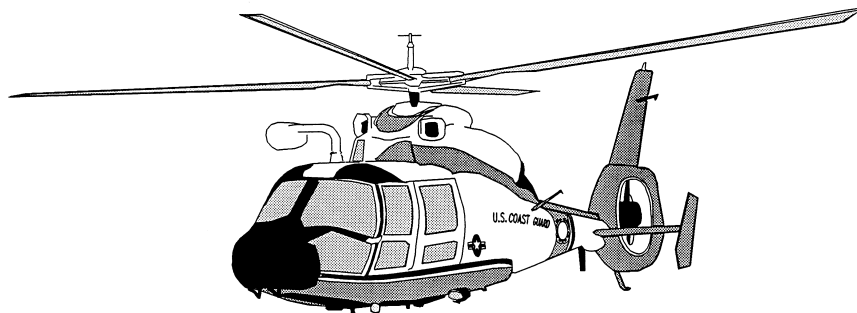


HH-65A Dolphin

A.1. Description

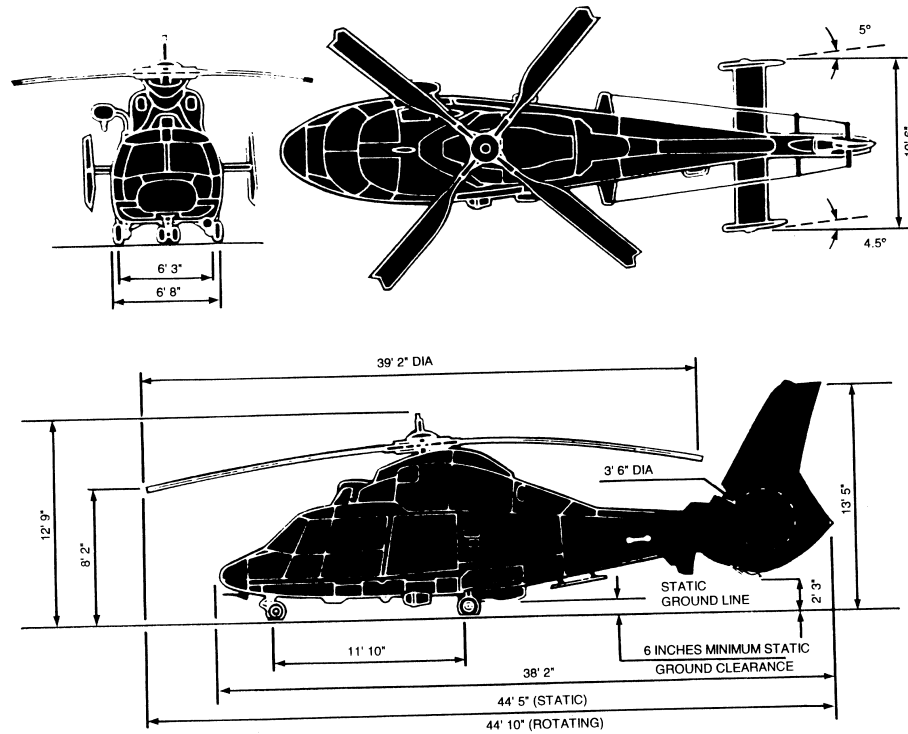
The **HH-65A "Dolphin,"** has two turbine engines that will produce a maximum airspeed of 165 knots (See Figure 19-1 and 19-2). The HH-65A cannot hover, hoist, or maneuver on just one engine. The normal crew is one or two pilots and a flight mechanic. For rescue missions, a rescue swimmer is normally carried in addition to the three crew members. The pilot in command sits in the right seat of the cockpit. Other general information includes:

- Maximum endurance with a crew of two pilots and one crew member is approximately three hours.
- Maximum of four passengers or survivors besides the three crew can be carried.
- Hoist capacity is 600 lbs. and the external cargo sling limit is 2,000 lbs.
- It will not land on the water except in an emergency. It will float if it is not badly damaged and the flotation bags are deployed.



HH-65A (Dolphin) Helicopter Left Front View
Figure 19-1

Figure 19-2 depicts the front, top, and side views of the HH-65A. The **fan in tail** (Fenestron) rotor configuration is evident and is the easy way to visually identify the HH-65A. This Fenestron also gives it a distinct, high-pitched sound.



Front, Top, and Side Views of the HH-65A Helicopter
Figure 19-2

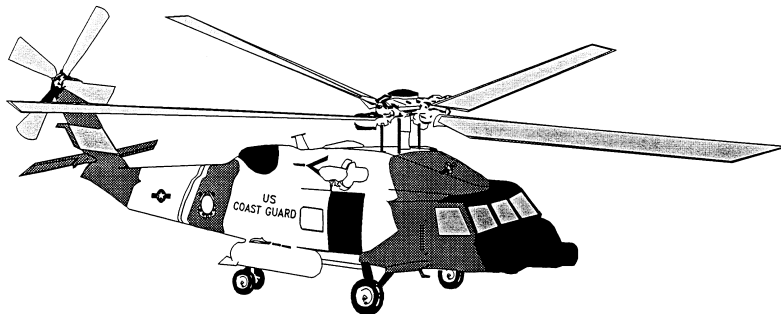


HH-60J Jayhawk

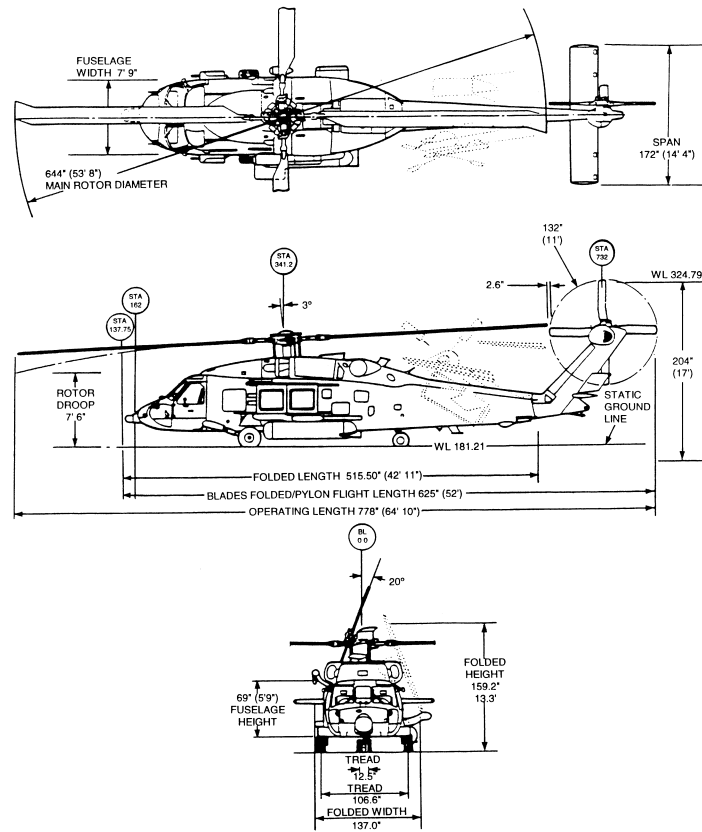
A.2. Description

The **HH-60J "Jayhawk,"** has 2 turbine engines that, depending upon the gross weight of the helicopter, will produce a maximum airspeed of 180 knots (See Figure 18-3). Although equipped with two engines, the HH-60J can normally maintain flight with one engine. Losing one engine is an emergency situation. The normal crew is two pilots and two crew members. For rescue missions, a rescue swimmer is normally carried in addition to four crew members. Other general information includes:

- Maximum endurance of the aircraft with maximum fuel and crew is approximately six hours.
- Hoist capacity is 600 lbs. and the external cargo sling limit is 6,000 lbs.
- It will not land on the water except in an emergency. Even with flotation bags, it will stay afloat only long enough for the crew to exit. The HH-60J is not amphibious.



HH-60J (Jayhawk) Helicopter
Figure 19-3



Top, Side, and Front Views of the HH-60J Helicopter
Figure 19-4

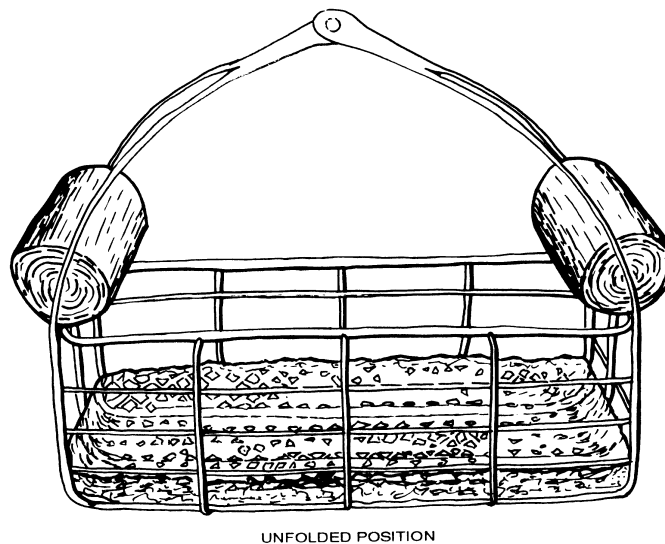


A.3. Helicopter equipment

Hoists by Coast Guard helicopters will normally be done with the following rescue devices and equipment.

A.3.a. Rescue basket

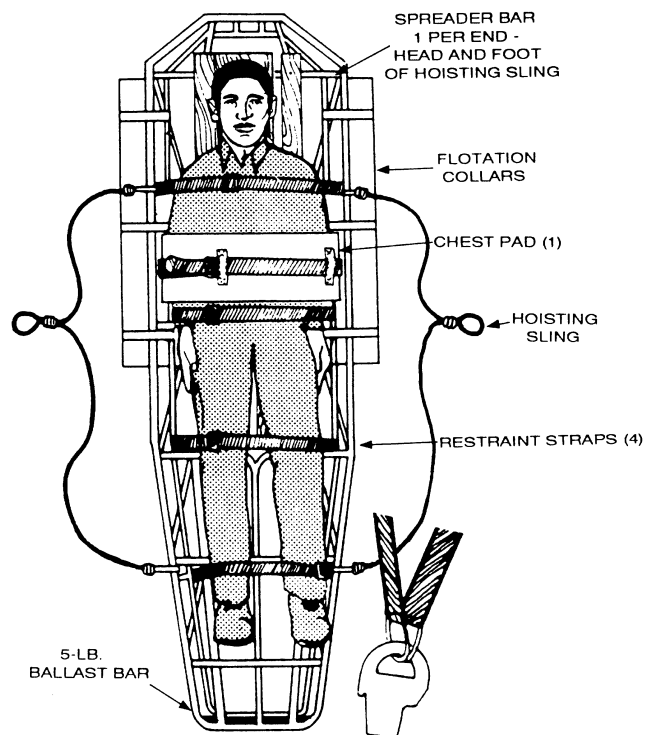
The multi-jointed (M/J) rescue basket is the primary device for hoisting survivors from land or sea during helicopter rescue operations. It provides protection for the individual being hoisted from dangers, such as striking vessel rigging. It has the capability to float. Hinged at all four corners, it folds inward. (See Figure 19-5). The basket is employed for personnel transfer in any weather condition.



The M/J Rescue Basket
Figure 19-5



- A.3.b. Stokes litter The **Stokes litter** (See Figure 19-6) is a stretcher with a flotation collar and chest pad for buoyancy. A 5-lb. ballast weight provides stability. A permanently mounted hoisting sling attaches the litter to the helicopter hoist cable. For restraining patients, a minimum of four securing straps, including chest pad, are supplied. Additional information is in the *Coast Guard Rescue and Survival Systems Manual*, COMDTINST M10470.10 (series).

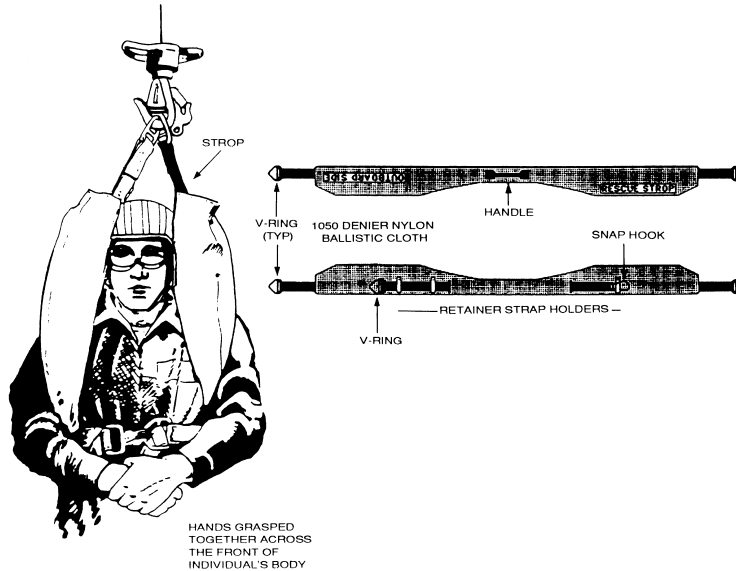


The Stokes Litter
Figure 19-6

The Stokes litter is used to transfer an injured or unconscious person in any weather condition. It is generally used when the patient's condition prevents use of the basket. When the patient is placed in a litter a crew member must tighten all straps to keep the person securely bound to it. There are four straps, as shown in Figure 19-6.



A.3.c. Rescue strop The **rescue strop** (See Figure 19-7) is used only to rescue persons familiar with its proper use, for example, a military aviator. It can handle one survivor wearing the usual flight gear and PFD.



NOTE

Use of chest retainer strap is mandatory during use of the rescue strop, except when hoisting rescue swimmers.

Rescue Strop
Figure 19-7

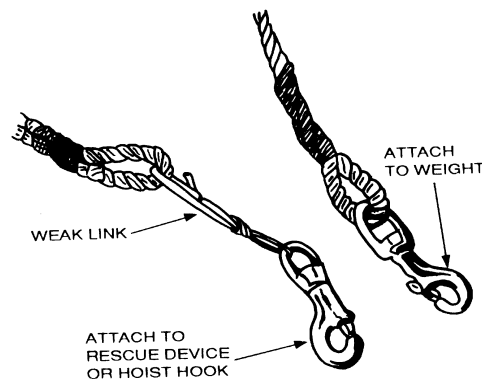


Other Helicopter Equipment

A.4. Trail line

Use of a **trail line** minimizes the time a pilot must maintain a precise stable hover without a reference point. The trail line consists of 105 feet of orange polypropylene line with a weak link and snap link at one end, and a snap hook at the other. The weak link (See Figure 19-8) is a safety device between the trail line and hoist hook, which protects the helicopter by not allowing more than 300 lbs. of force to be applied to the hoist. If more force is applied, the weak link will part. A 5 lb. bag is attached to the trail line snap hook for ease in delivery of the trail line. When used, the trail line will:

- Stabilize a rescue device to prevent sailing, swinging, and possibly becoming fouled
- Reduce the time a pilot must maintain a precise hover
- Reduce time on-scene



Trail Line's Weak Link
Figure 19-8

A.5. Dewatering pump kits

Dewatering pumps provide emergency dewatering for boats in danger of sinking. Under a load, the pump will run 1.5 to 2.5 hours on one gallon of gasoline. The pumps are designed to fit into a standard round aluminum container.

WARNING

Coast Guard dewatering pumps will not be used to pump flammable liquids.



Chapter 19: Air Operations



Section B. Helicopter Rescue Operations

Overview

Introduction

This section discusses the procedures and necessary safety precautions involved in a helicopter rescue operation.

In this section

These items are discussed in this section

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Rescue Swimmer

B.1. General

The rescue swimmer (RS) is a properly trained and conditioned certified Emergency Medical Technician (EMT). The RS is trained to deploy from a helicopter to recover an incapacitated victim from the maritime environment, day or night. Since a helicopter has weight and space limitations, a boat may be requested to recover an RS. The RS is equipped with a strobe light and signal flares.



Helicopter Hoisting Operations

B.2. General

NOTE

The Coast Guard uses the term “hoist” while the international community uses the term “winch”. The international version in Appendix 19-A has the term winch replaced by hoist.

Helicopter hoisting operations off of a vessel can pose great hazard to the aircrew, boat crew, and to whatever is being hoisted. The safety and efficiency of helicopter hoist operations is greatly improved if the crew of the vessel is briefed in advance on what is required. Appendix 19-A has the internationally approved “Sample Briefing to Pass to Vessel Prior to Helicopter Hoisting”. This briefing is particularly useful in case you conduct a boat-helicopter hoist or if you are asked to brief the distressed vessel as the helicopter is en route. The *Coast Guard Addendum to the National Search and Rescue Manual*, COMDTINST M16130.2 (series) has a similar version.

Boat-helicopter operations require team effort, alertness, and cooperation among crew members aboard both the boat and helicopter. Since the noise level may hinder communications, the coxswain and pilot usually plan the operation before the helicopter is overhead. Once the helicopter is in position, the aircrew member serving as hoist operator gives the pilot maneuvering instructions for guiding the rescue device to the boat deck below. The safety briefing discussed earlier in this section and provided in Appendix 19-A provides general guidelines. Specific guidelines for the boat crew is discussed below.

WARNING

Safety is always a primary consideration. Anytime the boat coxswain or helicopter pilot feels the operation is unsafe, it should be broken off and, if practical, begun again.



B.3. Boat crew preparations for hoisting

Before the helicopter arrives, the coxswain will complete action on the following general categories of preparation.

If radio communications are lost and an emergency breakaway is required, use the boat's blue emergency light or other emergency signal to signal the breakaway to the helicopter.

B.3.a. Navigation

Check charts for hazard that would prevent the boat from maintaining course and speed until the hoist is complete.

B.3.b. Communications

Establish communications with the helicopter as early as possible to exchange information and instructions. This includes:

- Use of primary and secondary working frequencies.
 - On-scene weather
 - Exact position
 - Condition of persons, if any, requiring medical attention
 - Any information to aid the pilot in selecting the rescue device
 - Total number of crew and other persons on board your boat, and total number on board the helicopter
 - Conduct hoist briefing with the helicopter pilot.
-

B.3.c. Protective gear

Ensure all **protective gear** is properly worn, including:

- Head (helmet), eye, hearing, and hand (gloves) protection
 - PFDs, antiexposure coveralls, and dry suits (depending on weather conditions)
-

B.3.d. Loose gear

Stow or secure all **loose gear** on deck (e.g., hats, cushions, loose paper, etc.).

B.3.e. Rigging

Lower and secure all antennas, booms, **rigging**, and flag staff, if possible.

B.3.f. Hand signals

Designate one boat crew member to give **hand signals** to the hoist operator.



B.3.g. Brief crew

Brief the crew and person(s) to be hoisted regarding the type of hoist to be expected (e.g., basket, litter, or strop).

B.4. Boat crew safety precautions

During the hoisting evolution, **safety** is paramount. All boat crew members will observe the following safety precautions.

WARNING 

The downwash of a helicopter is very powerful. It can blow a person overboard. It can also blow loose gear over the side. Loose objects such as articles of clothing can be caught in the air currents produced by the rotor blades and sucked into the engines.

WARNING 

Never attach, tie, or secure anything to the boat that is also attached to the helicopter.

- ALWAYS allow the rescue device to contact (ground to) the boat, water, or a "Deadman's Stick" (static discharge wand), **BEFORE YOU TOUCH IT**. A helicopter in flight builds up static electricity.
 - ALWAYS TEND BY HAND any trail lines, basket slings, or hoisting cable. **DO NOT ATTACH** them to the boat.
 - ALWAYS wait for slack in the hoist cable before attempting to hook onto the device to be hoisted. This precaution allows for relative motion between helicopter and boat.
 - ALWAYS keep the trail line and hoisting cable clear of the boat's rigging.
 - ALWAYS unhook the rescue device before moving it inside the boat.
-



Helicopter Boat Positioning

B.5. General

When working with a helicopter at night, NEVER shine a light towards or take flash pictures of the helicopter. The sudden light may temporarily blind or disorient the pilot.

NEVER use pyrotechnics or illuminating signals without contacting the pilot.

B.6. Course and speed

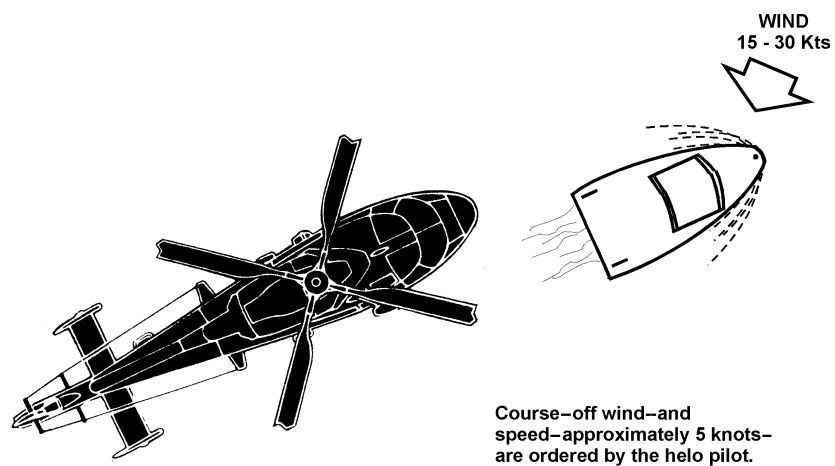
Hoists from standard boats are normally made from the stern. The pilot normally will direct the coxswain to assume a certain course and speed with a relative wind speed of 15 to 30 knots and 35-45 degrees off the port bow (see Figure 19-9). Sometimes, sea conditions may require departure from this rule, especially to minimize boat rolling. The boat must maintain a steady course and speed.

B.7. Nonstandard boats

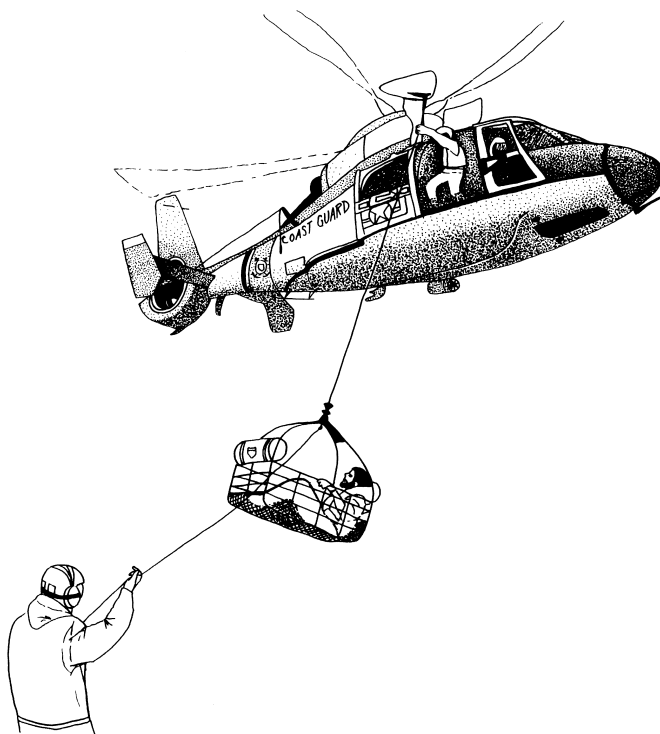
Hoists from nonstandard boats (e.g., RIBs, UTLs, or Auxiliary craft) may require a different technique. The helicopter will hover and lower the rescue device to a stationary position near the surface. The boat should approach and maneuver under the hoist for delivery.

B.8. Helicopter-boat configuration

The rescue device will be lowered from the right side of the aircraft. The helicopter will approach the boat from astern (downwind) and hover off the port side, aft of amidships. This method of approach allows the pilot and hoist operator (located on the right side of the aircraft) a full view of the boat during the evolution (see Figure 19-10).



Helicopter-Boat Positioning
Figure 19-9



Trail Line Delivery of the M/J Rescue Basket
Figure 19-10



B.9. Dead in the water

When a boat is dead in the water (DIW), the helicopter may approach the boat's bow on the starboard side. Due to the downwash, the boat will almost always turn clockwise and the aircraft will maintain visual contact by turning in the same direction during the hoist.



Delivery of the Rescue Device

B.10. General

Delivery of a rescue device from the helicopter to a vessel in distress or for training will be accomplished by one of three methods:

- Direct Delivery
- Trail Line Delivery

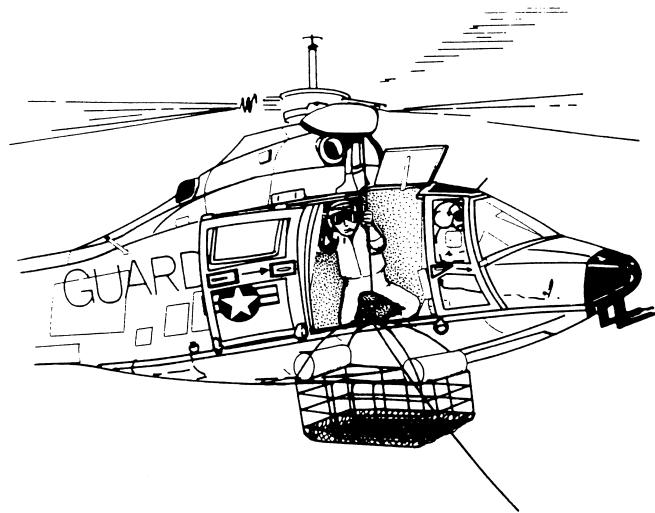
After the rescue device is delivered (and if previously agreed to in the aircraft brief), a boat crew member will disconnect the hook before moving away from the delivery/hoisting location. **NEVER ATTACH THE HOOK TO ANY PART OF THE BOAT.** Re-attach the cable to the device at a time agreed upon with the helicopter pilot.

B.11. Direct delivery

The rescue device is lowered directly to the deck of the vessel.

B.12. Trail Line Delivery

A 5-lb. weight bag is attached to the trail line and lowered from the helicopter to the vessel. The helicopter will then back off to a safe hoisting distance while paying out the trail line. The non-weighted end of the trail line is attached to the rescue device (weak link first) (See Figure 19-11) and lowered to the vessel (See Figure 19-10). Boat crew members will tend the trail line by hand-over-hand method, exerting enough strain to guide the rescue device to the delivery point on deck. A second crew member should back up and coil the line.



M/J Rescue Basket Going Down
Figure 19-11

B.13. Indirect delivery

This type of delivery is designed for delivery of the CG-P1B dewatering pump. The trail line, weighted bag attached to the weak link first, is delivered from the helicopter to the vessel. The helicopter will pay out the trail line as the helicopter backs off and establishes a low hover with the rotor blades and downwash clear of all rigging (see Figure 19-12). The hoist operator will then attach the end of the trail line to the pump container and deploy it to the water (see Figure 19-13). The boat crew member will then pull the pump aboard.



Indirect Delivery of Pump
Figure 19-12



Pump In the Water
Figure 19-13



Hoisting

- B.14. Basket hoist** Every person transferred must wear a PFD and head protection, if available. The person must be positioned in the basket with hands placed palms up under the thighs. This position will keep the arms tucked in close to the body and inside the basket. The crew member assisting the person into position must ensure that no part of the person's body is outside of the basket and that the basket does not hang up on equipment attached to the boat. When the individual to be hoisted is in the proper position, the boat crew member will give the "thumbs up" to the hoist operator, who will commence the hoist (See Figure 19-14). If a trail line is used, tend it over the side. Do not throw the end.



**M/J Rescue Basket With Person Properly Positioned
and Ready For Hoist
Figure 19-14**



B.15. Stokes litter hoist**CAUTION !**

Helicopter rescue baskets are collapsible. When connecting and disconnecting the hoist cable, support both ends of the basket to avoid injury to the person in the basket.

The litter will be provided by the helicopter. When a boat has a hoistable litter (as outlined in the *Coast Guard Rescue and Survival Systems Manual*, COMDTINST M10470.10 (series)), the aircraft commander will determine if it will be used. When the victim is placed in the litter, a boat crew member must tighten all restraining straps around the person. There are four straps and one chest pad. The crew member tending the litter must make certain it does not get hung up on boat equipment. When the person is to be hoisted, the boat crew member will give a "thumbs up" to the hoist operator, who will commence the hoist.

B.16. Rescue strop hoist

The strop WILL ONLY BE USED to transfer trained, uninjured military personnel in fair weather. The strop is basically a collar which has one end attached to the hoist cable. When the person to be hoisted positions the collar under the armpits, a boat crew member must ensure the safety straps are fastened. The end of the collar opposite the hoist cable has a v-ring which attaches to the hook. Figure 19-7 shows how the strop looks when properly connected. This device is not likely to hang up on attached equipment as easily as the other rescue devices.

B.17. Hoisting of equipment

Secure and monitor all attachment points and the equipment, to keep it from hanging up.

B.18. Commence hoist

When a person or equipment is secured in the rescue device, the designated boat crew member will give the hoist operator a "thumbs up" hand signal. The hoist operator will then commence lifting the rescue device. During this procedure, the boat crew must ensure the rescue device is not caught on anything attached to the boat.

B.19. Cast off

When a trail line is employed, a boat crew member shall tend it until it reaches the weighted end. Then toss it over the side of the boat on which the hoist was conducted (normally the port side), but not upward toward the rotors.



B.20. Post hoist

Once the trail line is cast off, the coxswain will maneuver to starboard and away from the helicopter.

**B.21. Emergency
breakaway
procedure**

Safety during helicopter operations cannot be overemphasized. Crew members must stay alert and report any danger signs. If either the coxswain or pilot feel the operation is unsafe, then a breakaway should be conducted. Procedures for the coxswain to conduct a breakaway are:

- Direct the crew to push the loose cable, rescue device, and trail line over the side (toward the helicopter),
 - Transmit the word "BREAKAWAY" to the pilot,
 - Turn away from the helicopter, and
 - Energize the blue emergency light or identification light, if practical or applicable.
-